



TNRCC

Pollution Prevention and Recycling in Texas

**Report to the
75th Legislature**

***Fifth Anniversary
1992-1997***

*The world we have created today,
as a result of our thinking thus far,
has problems which cannot be solved
by thinking the way we thought
when we created them.*

- Albert Einstein

OPPR Mission

To provide leadership and create incentives for businesses, government, and individual Texans to significantly reduce pollution and waste, which combined with a strong regulatory program, will conserve our resources, provide economic benefits, and produce tangible improvements in our air, land, and water.

For more information, contact:

Office of Pollution Prevention and Recycling
Texas Natural Resource Conservation Commission
PO Box 13087
Austin TX 78711-3087
(512) 239-3100

Internet: <http://www.tnrcc.state.tx.us>

Publications: (512) 239-0028

CLEAN TEXAS 2000 Environmental Information Line: 1-800-64-TEXAS

Pollution Prevention and Recycling in Texas

Report to the 75th Legislature

***Fifth Anniversary
1992-1997***

Contents

Executive Summary	1
Introduction	7
The Challenge: Pollution in Texas	8
The Response: Programs and Accomplishments	10
Business and Industry	10
Pollution Prevention (P2) Planning	11
Site Assistance Visit Program (SAV)	11
Permanent Pollution Prevention Program (P4)	12
RENEW	12
Workplace Waste Reduction and Recycling	12
Recycling Market Development	13
CLEAN INDUSTRIES 2000	15
CLEAN TEXAS STAR	16
Local Governments and Community Groups	17
Community Waste Prevention and Recycling	17
Large-Scale Centralized Composting	17
Backyard Composting	18
Solid Waste Assistance Partnerships (SWAP)	18
Grants Assistance	19
Recycling at School	19
Recycling Market Development	20
CLEAN CITIES 2000	20
All Texans	21
CLEAN TEXAS REPORTER	21
Texas Recycles Day	21
Lake and River Cleanups	22
Texas Country Cleanups	23
Household Hazardous Waste Collections	23
TRI Community Workshops	24
Teaching Environmental Sciences	24
Governor's Awards for Environmental Excellence	25

Regulatory Innovation	26
Integration	26
Regulatory Development	27
Regulatory Integration Training	27
Permit “Threshold” Project	27
Regulatory Incentives	27
Texas/Mexico Border Pollution Prevention Initiative	28
Build Local Capacity	28
Joint Audits	28
Waste Reduction Workshops	29
International Market Development	29
Goals for the Future	30
Technical Assistance: Build Local Capacity	30
What Gets Measured Gets Done	31
Shift toward Prevention, away from Control	32
Appendixes	
A Office of Waste Exchange	
B Waste Reduction Advisory Committee Annual Report	
C Members of CLEAN CITIES 2000	
D Governor’s Awards for Environmental Excellence Winners 1993-96	

Two hundred twenty-six industrial facilities save \$30 million each year by preventing the generation of 96,000 tons of waste, conserving 317 million gallons of water, saving 11.3 million kilowatt-hours of electricity, and eliminating 183,300 pounds of emissions.

Recycling processors and manufacturers employ 20,000 Texans. More than \$2.8 billion in value is added to the Texas economy annually through the upgrade or processing of recycled materials.

These are the results the Texas Legislature foresaw six years ago with passage of Senate Bill 1099, the Waste Reduction Policy Act (WRPA), and Senate Bill 1340, the Omnibus Recycling Act. WRPA called for the establishment of voluntary programs that prevent pollution before it is generated, and encouraged Texans to look beyond compliance for voluntary, market-based approaches to environmental management. The Omnibus Recycling Act set ambitious waste reduction recycling goals and spurred a comprehensive array of programs to meet those goals.

The Challenge

Texas has both a rapidly growing population and an expanding industrial base. The U.S. Bureau of the Census recently reported that the population of Texas increased by 2.1 million people between 1990 and 1996, bringing the total to 19 million people. The manufacturing share of the Texas Gross State Product increased 21 percent between 1987 and 1994, according to the Texas Comptroller of Public Accounts. While growth brings many economic benefits to Texas, the consequences of rapid growth also pose the following environmental management challenges:

- 10,000 registered hazardous waste generating facilities cause Texas to rank near the top among states
- more than 1,200 sites report to the federal Toxics Release Inventory, first among states in total releases of listed toxic chemicals in 1994
- 60,000 businesses are subject to the federal Clean Air Act
- 22 million tons of municipal solid waste are disposed of annually
- four northern Mexican states border Texas with 1,521 maquiladora plants that return 53 percent of their waste to or through Texas, according to the Mexican Attorney General for the Environment

To carry out the mandates of the WRPA and the Omnibus Recycling Act, the Texas Natural Resource Conservation Commission (TNRCC) created the Office of Pollution Prevention and Recycling (OPPR) in January 1992.

The Trends and Results

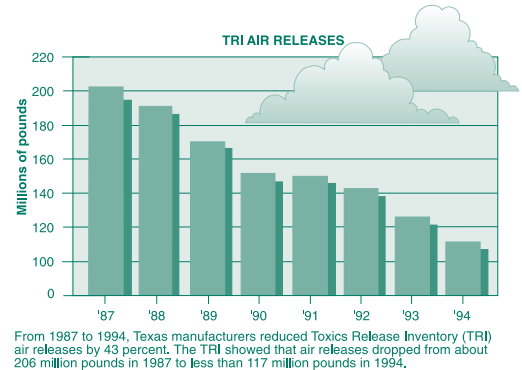
Going into its sixth year, the TNRCC's OPR and its customers have demonstrated that the most cost-effective way to manage environmental challenges with Texas' current high-growth rate is to prevent waste and pollution, and where not preventable, to reuse and recycle what is generated. A list of environmental trends and pollution prevention results in Texas follows:

Chemical releases decreased 31 percent despite a 21 percent growth in manufacturing, between 1987 and 1994.

- Between 1987 and 1994, Texas manufacturers reduced releases of chemicals listed on the federal Toxics Release Inventory (TRI) by 31 percent. This noteworthy decrease occurred despite a 21 percent increase in the growth of manufacturing.

- Texas industrial facilities reduced hazardous waste generation by 19 percent from 1993 to 1994.

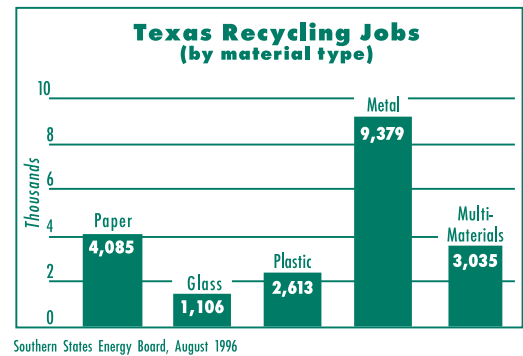
- During 1994, Texas industrial facilities "source reduced" more than 40 million tons of hazardous waste. (Source reduction is a measure of how much waste never gets generated; the measure takes into account increases in production efficiency. It is preferred to reuse and recycling, the "end-of-pipe" controls that are used to manage waste after generation.)



Recycling in Texas: 382 communities reported that they offer recycling; 130 provide curbside recycling; 153 report that they compost organic material at a central location in the community.

- One hundred and thirty Texas cities provide curbside recycling collection to about 1.5 million single-family households. In fiscal 1996, 382 Texas cities and counties offered citizens some type of recycling program, up 45 percent from 1995.

- At the end of 1995, 153 cities and counties reported that they compost or mulch brush other organic material at a central location on community-wide scale, an increase from 58 cities in 1993. There are 40 commercial composting operations in the state, twice many as existed in 1990.



- The Texas recycling industry now employs more than 20,000 Texans at more than 400 firms, and accounts for \$2.8 billion in value added annually to the state's economy through the upgrade or processing of recycled materials.

The Programs

The TNRCC's OPPR strives to develop innovative solutions and partnerships that achieve measurable results. Pollution prevention and recycling produce "bottom line" benefits to Texas businesses, citizens, and local governments by reducing raw material costs, producing better environmental compliance, lowering state fees, eliminating the need for some permits, and improving worker health and safety. Texas also benefits when regulated entities reduce their pollutants below threshold levels, thus reducing required interaction with the agency and easing demand on TNRCC's resources.

Each program uses a combination of tools to meet the legislative directives, including:

- research
- technical assistance
- "how-to" publications
- workshops
- site visits
- program measurement and evaluation
- data analysis
- grant assistance
- incentives and recognition

Programs are designed to use the most appropriate and effective methods to reach the decision makers, government officials, industry professionals, and individual citizens who can make pollution prevention and recycling happen.

The willingness of Texas organizations and individuals to voluntarily reduce waste is the primary reason for their success. As a result of this commitment and action, the Texas volunteer-based approach to pollution prevention and recycling is recognized by the federal government, other states, and other countries as a model for reducing pollution by using market-based incentives. All Texans play a critical role in improving their environment, whether at work, at home, or out in the community. Individual actions taken collectively have a significant impact on the environment. Recognizing this critical role, the TNRCC has committed significant resources not only to educate Texans, but also to provide hands-on activities that they can undertake to truly make a difference. Some program highlights, listed by primary customers, are as follows:

All Texans play a critical role in improving their environment, whether at work, at home, or out in the community.

The willingness of Texas organizations and individuals to voluntarily reduce waste is the primary reason for [the programs] success.

For Texas Businesses



- The 226 industrial facilities that participate in voluntary pollution prevention **site assistance visits** are saving \$30.4 million annually, while reducing hazardous waste generation by 43,313 tons, electricity use by 11.3 million kilowatt-hours, water use by 317.4 million gallons, and air emissions by 183,300 pounds.
- The **CLEAN INDUSTRIES 2000** program now has a membership covering 147 of the state's 200 largest hazardous waste generating facilities. In 1993 member facilities accounted for all of Texas' 12 million-ton hazardous waste reduction. CLEAN INDUSTRIES 2000 members also sponsor more than 500 local environmental projects.
- **CLEAN TEXAS STAR** members tripled the average quantity of material recycled in 1995, the first year of the program. With more than 3,000 members, the program has become the largest and fastest growing program of its kind in the country.
- The **Resource Exchange Network for Eliminating Waste** (RENEW) assisted industrial facilities in recycling 660 million pounds of materials, saving them more than \$2.4 million in avoided disposal costs since the program's inception (1988-1996).
- Issuance of new agency rules reducing regulatory requirements and simplifying procedures for establishing large-scale compost operations has stimulated the growth of a vital new conservation-based industry in the state.

For Texas Citizens

Sixty collection events around the state in 1996 diverted 744,163 pounds of household hazardous waste.

- Through the **lake and river cleanup** program, 23,077 volunteers collected 513 tons of trash from in and around 53 of the state's lakes and rivers in 1996.
- Sixty **household hazardous waste collection** events were held across the state with 30,854 participants in 1996, collecting 744,163 pounds of hazardous waste.
- Twenty-five **agricultural waste pesticide collection** events have collected 975 tons of waste pesticides from 2,061 agricultural producers since the beginning of the program.
- At 41 **Texas Country Cleanup** events in fiscal 1996 1,347 rural and agricultural producers brought in 57,380 empty pesticide containers; 13,009 automobile tires; 1,381 tractor tires; 27,620 gallons of used oil; 46,670 oil filters; and 3,152 automotive batteries.

- A total of 145,000 Texans made voluntary recycling pledges at 301 events on **Texas Recycles Day**, 1996.
- Practical information on how individuals can act to improve the environment reached 1.8 million Texas households in 1996 through the **CLEAN TEXAS REPORTER** television broadcast segments. Because stations pay to air the segments in their viewing area, the TNRCC is able to reach these Texans economically, which otherwise would have cost \$3.5 million in advertising.
- **Community environmental workshops** around the state inform citizens about toxics in the environment, specifically, the Toxics Release Inventory (TRI). Participating citizens receive hands-on computer training on how to obtain TRI data and related information.
- Texas teachers receive environmental training, resource materials, and low-cost activities for helping students use critical thinking skills in environmental decision-making through the Teaching Environmental Sciences summer program. Community sponsors and nine universities work with the TNRCC to provide this graduate-level training to Texas teachers.

For Texas Communities and Governments

- The **CLEAN CITIES 2000** program has 67 participating municipalities, representing 6 million Texans. In 1995, members diverted 336,537 tons of solid waste from landfills, saving \$10 million in disposal costs.
- The new **Solid Waste Assistance Partnerships** (SWAP) provides **CLEAN CITIES 2000** members and applicants with a customized and comprehensive waste reduction program. The effort addresses not only a community's waste management programs but also the decision-making and implementation structures that maintain them. A local team is built to ensure the successful implementation of a customized Plan of Action.
- A series of workshops assisted 26 military installations in Texas with implementing comprehensive and coordinated recycling programs.
- Regional and local officials receive training and technical assistance to manage state grant funding. The funding, which recently shifted from state to regional entities, is used mainly to reduce waste and increase recycling and composting. Local and regional managers receive help with planning, managing, evaluating, and reporting on their grant-funded programs. TNRCC staff members also help regional officials assess local grant proposals.

*FPO
Clean
Cities
Chart*

For Environmental Regulators

Training and technical assistance helps regulators in the following areas:

- exploring opportunities to implement pollution prevention in TNRCC rule-writing, permitting, inspections, and enforcement
- identifying and overcoming regulatory barriers to pollution prevention
- encouraging flexibility in the use of federal grant funds

For the Texas / Mexico Border Region

A series of joint site assistance visits to maquiladoras in Mexico in 1995 and 1996, with the Mexican Attorney General for the Environment, resulted in a 7,009-ton reduction in hazardous waste generation and a \$4 million savings from avoided disposal costs.

Recommendations

A window of opportunity exists to address environmental concerns in a proactive and innovative manner. Over the last five years, the TNRCC's OPPR has built a foundation for pollution prevention, waste reduction, and recycling in Texas. Preventing pollution and waste has proved extremely effective for environmental protection and economic growth. In addition to preserving natural resources, pollution prevention means avoided cleanup and disposal costs savings that multiply over time, providing a competitive advantage for Texas businesses.

The foundation is in place. In order to create a permanent infrastructure for environmental management through pollution prevention and waste reduction, the following activities should be considered:

***Pollution prevention
means avoided
cleanup and
disposal costs
savings that
multiply over time***

- continue to provide the technical assistance that empowers organizations to build their own pollution prevention and waste reduction skills and capacity
- assure that appropriate measures facilitate informed decisions based on the true costs of pollution and waste management practices
- identify incentives for and barriers against pollution and waste prevention throughout the existing regulatory structure
- provide regulated industries with the flexibility to achieve their environmental goals while improving business performance and increasing public participation in the regulatory process

Introduction

“It is the policy of the state to reduce pollution at its source and to minimize the impact of pollution in order to reduce risk to public health and the environment and continue to enhance the quality of air, land and water to the state where feasible.”

-- 72nd Texas Legislature, 1991.

With passage in 1991 of the Waste Reduction Policy Act and the Omnibus Recycling Act, the Legislature made clear its interest in finding preventive approaches to environmental stewardship in Texas. The Legislature recognized that significant, long-term pollution reduction could be reached with cooperation from industry and environmental leaders through an approach based on flexibility, creativity, and accountability. The two landmark bills mandated that state programs encourage the reduction of hazardous waste, toxic emissions, and municipal solid waste. These laws give business and government the flexibility to design pollution prevention programs without proscriptive government regulation.

The **Office of Pollution Prevention and Recycling** (OPPR) of the Texas Natural Resource Conservation Commission was created in 1992 to implement these laws, by focusing on developing innovative solutions and partnerships that achieve measurable results. Pollution prevention and recycling produce “bottom line” benefits to Texas businesses, citizens, and local governments. Critical elements that form the foundation of the program include the following:

Multimedia (Air, Water, and Waste): Most environmental programs focus separately on either air, water, or waste. The TNRCC program takes a different approach a multimedia approach since its customers have multiple environmental challenges.

Market-Based: The program takes a value-added approach to environmental management by making cost cutting suggestions and by increasing market opportunities for recyclable materials.

Partnership-Building: The program makes extensive use of formal and informal partnerships to leverage its service delivery as widely as possible.

Customer-Focused: The programs are voluntary. Staff members execute projects based on customer requests for their services. Programs are frequently updated to meet the changing needs of a complex customer base. Training and technical assistance materials are designed to be modular and are customized to meet specific needs, such as military installations, or for specific purposes, such as reducing air emissions in Tyler, Texas. Specific customers include business and industry, local governments and interest groups, educators, Texas/Mexico border communities, and individual citizens. The program also looks for pollution prevention opportunities among TNRCC regulatory programs such as rule writing, permitting, inspections, and enforcement.

Results-Oriented: OPPR programs differ from conventional environmental efforts by evaluating effectiveness through outcome measurements, including economic benefits derived, rather than solely from activity measures. Outcome measures provide detailed information on the effectiveness of programs, and are used to continually improve the programs.

The Challenge: Pollution in Texas

Texas has a rapidly growing population and an expanding industrial base. The U.S. Bureau of the Census recently reported that the population of Texas increased by 2.1 million people between 1990 and 1996, bringing the total to 19 million people. Texas is home to 60 percent of the nation's petrochemical production and 25 percent of its refining capacity. The manufacturing share of the Texas Gross State Product increased 21 percent between 1987 and 1994, according to the Texas Comptroller of Public Accounts. While these conditions bring economic benefits to Texas, they also pose considerable environmental management challenges.

Toxics Release Inventory (TRI)

The TRI is a publicly available database that contains toxic release and transfer information from manufacturing facilities in Texas. According to the TRI, Texas ranks first for on-site releases of toxics to air, land, and water. In 1994, about 1,200 Texas manufacturing facilities reported to TRI a total of 250 million pounds of toxics released to air, land, and water, which include the following:

- 127 million pounds of toxic air emissions
- 3 million pounds of TRI chemicals discharged to streams, rivers, lakes, and bays
- 14 million pounds of toxic chemicals released on land, including landfilling, land treatment, surface impoundments, and other land disposal
- 106 million pounds of toxics deep-well injected

Hazardous Waste

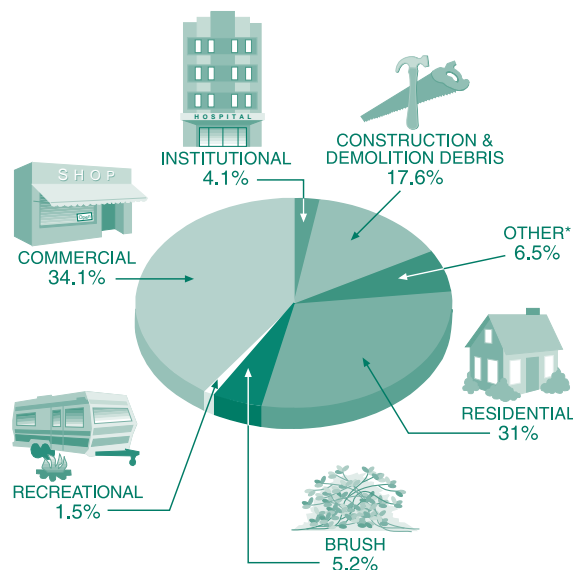
Texas has 10,000 registered hazardous waste generating facilities, ranking near the top among the states. In 1994, 155 million tons of hazardous waste were generated in Texas. Texas ranks first in the nation for total hazardous waste generated. This ranking is the result of large quantity of aqueous wastes associated with certain industries that are usually treated on-site to remove toxicity.

Municipal Solid Waste

In 1994, 21.8 million tons of solid waste were disposed of in Texas landfills. The annual cost of solid waste disposal in landfills continues to rise; between 1993 and 1996, the average tipping fee increased to \$28 per ton from \$19 per ton. Yet up to 80 percent of municipal solid waste could be diverted from landfills by recycling or composting.

About half of the Texas waste stream comes from households and about half from commercial sources. Each Texas household produces about 15 pounds of hazardous waste each year. More than 25 percent of the state's waste stream is made up of yard trimmings and other organic material.

WASTE DISPOSAL BY SOURCE IN
MUNICIPAL SOLID WASTE (MSW) LANDFILLS IN TEXAS,
1994



Agricultural areas of the state have special waste management problems. For example, improper storage or disposal of agricultural pesticide waste can contaminate groundwater and surface water and present a health threat. In addition, citizens from rural areas of Texas may have difficulty finding recycling centers.

Air Quality

The state has 60,000 businesses subject to the federal Clean Air Act. Under the Act, Texas has four nonattainment areas, where automobiles, trucks, motorcycles, and off-road vehicles contribute almost 745 tons of volatile organic compounds (VOCs) each day. Proposed federal ozone requirements could cause several Texas cities to fall into nonattainment.

Cost of Pollution Cleanup

In Texas, there are 47 state Superfund sites proposed or listed, and 28 federal Superfund sites. About \$290 million has been spent or awarded to clean up federal Superfund sites, which includes \$26 million in state matching funds. Spending on state Superfund sites through the year 2000 depends on the available balance in the Hazardous and Solid Waste Remediation Fee Fund.

Texas/Mexico Border

Texas has the longest border with Mexico. Four of Mexico's six northern states border on Texas: Tamaulipas, Nuevo Leon, Coahuila, and Chihuahua. The four border states have 1,521 maquiladora plants, which assemble products for re-export using United States and Canadian components. Of these, 596 plants are located in six Mexican border cities adjoining Texas and employ 304,384 workers. The Mexican Attorney General for the Environment estimates that 53 percent of maquiladora waste is returned to or through Texas. Under the terms of the La Paz Agreement, a 1983 environmental treaty between the United States and Mexico, waste generated by maquiladoras using United States components and materials must be returned to the United States for treatment, storage, and disposal.

Reaching Texans

A recent statewide survey shows that 93 percent of Texans have strong concerns about environmental pollution, and 89 percent turn to the mass media to get environmental information. However, the majority of stories do not offer solutions that the average citizen can personally use. A statewide media campaign, six-weeks long, costs at least \$250,000.

Texans throw away enough grass clippings each year to fill a quarter million garbage trucks. Line these bumper to bumper, and they'd stretch from Beaumont to El Paso and back again. The price tag for sending grass clippings to the landfill is about \$80 million a year.

The Response: Programs and Accomplishments

Business and Industry

Over the last five years, the TNRCC's OPPR has built a foundation for pollution prevention and waste reduction in Texas. Preventing pollution and waste has proved to be an effective tool for environmental protection and economic growth. In addition to preserving natural resources, businesses avoid cleanup and disposal costs savings that multiply over time and can provide a competitive advantage. The following programs have been undertaken to build the foundation.

Pollution Prevention (P2) Planning

The Waste Reduction Policy Act (WRPA), enacted in 1991, directs certain facilities that generate hazardous waste to report under the Toxics Release Inventory (TRI) and to develop site-specific pollution prevention plans, which are confidential. The TNRCC assists facilities in preparing plans that fit within their business strategies. To date, more than 1,000 Texas industrial facilities have prepared pollution prevention plans. Consider the following:

- Almost 80 percent of facilities surveyed indicate that the plans helped them reduce waste.
- Facilities with pollution prevention plans reported a 20 percent reduction in hazardous waste generation from 1993 to 1994. Facilities without WRPA plans showed a 3 percent increase during the same period.
- **Texas facilities reduced hazardous waste generation by 19 percent from 1993 to 1994.**
- During 1994, Texas industrial facilities reported a source reduction of more than 40 million tons of hazardous waste. (Source reduction is a measure of how much waste never gets generated; the measure takes into account increases in production efficiency. It is preferred to reuse and recycling, the "end-of-pipe" controls that are used to manage waste after generation.)
- According to WRPA annual progress reports, Texas industrial facilities projected that by 1997, more than 50 million tons of hazardous waste will not be generated because of source reduction activities. Facilities met 80 percent of this goal by 1994.

The Benefits of P2 Planning in Texas: 20 percent hazardous waste reduction with P2 Planning vs. 3 percent waste increase without P2 Planning. (TNRCC analysis of WRPA results)

RESULTS

Production Up, Waste Down. An aircraft maintenance facility in Fort Worth used the P2 assessment manual and workshop to design a program that reduced waste generation by 63 percent, even while production increased. The facility developed a plan that includes waste segregation, material substitution, and employee awareness training. The facility's plan eliminated 88 tons of hazardous waste that previously was shipped off-site for disposal or incineration.

Pollution
Prevention (P2)
Planning

Regulatory Relief

The Industrial Pollution Prevention team can access data reported to other TNRCC programs in order to reduce WRPAs reporting requirements. The result is a revised WRPAs form that will require companies to report less than a third of the information previously required.

Site Assistance Visit Program (SAV)

Under this program, engineers and environmental scientists provide voluntary pollution prevention technical assistance and training to industrial facilities. Since 1993, more than 226 facilities have received hands-on training. As a result, facilities reported the following annual savings:

- \$30 million saved
- 96,000 tons of waste reduced
- 317 million gallons of water conserved
- 11.3 million kilowatt-hours of electricity saved
- 183,300 pounds of emissions eliminated

SAV graphic
with Can,
Clouds &
Dollar Sign

RESULTS

\$1.3 million SAVed. A facility in Tyler saves \$1.3 million each year after a \$380,000 investment. A solvent-based steel precoating system was replaced with a new process that eliminated more than 80 tons of hazardous waste and 12,000 pounds of emissions. This is an important achievement since Tyler is a near-nonattainment area for ozone.

Site Assistance
Visit Program
(SAV)

Permanent Pollution Prevention Program (P4)

The P4 program uses a **regional approach to solving environmental problems** by bringing industrial facilities together and providing them with training and technical assistance to identify and share opportunities for waste reduction. P4 is a voluntary program that helps facilities create a framework from which they can develop sustainable pollution prevention programs, and identify and implement future reduction opportunities.

RESULTS

The Lower Colorado River Authority (LCRA) instituted a P4 project at its electric generating facilities that resulted in 46 separate pollution prevention projects at six facilities. **LCRA was able to cut hazardous waste generation by 50 percent, saving \$1.4 million in avoided compliance costs.**

Permanent
Pollution
Prevention
Program (P4)

PARTNERSHIPS

Permanent Pollution Prevention Program (P4)

***Leveraging Resources through Partnerships.** The Texas Pollution Prevention Partnership was created in 1996 to share resources and knowledge between the TNRCC and federal facilities in Texas about pollution prevention activities that could be implemented at multiple facilities. Members include the TNRCC, NASA, the Department of Defense, the National Guard, and EPA. Joint site visits at Fort Hood, Fort Bliss, Dyess Air Force Base, and Laughlin Air Force Base **identified 200 opportunities for reductions in hazardous waste, nonhazardous waste, air emissions, water usage, and energy usage.** For example, an on-site visit to Laughlin resulted in identification of 30 pollution-prevention options. The base has phased in three of the options and expects to save \$21,000 a year, to reduce water use by 44,000 gallons, and to prevent the generation of 8,000 pounds of hazardous waste.*

RENEW

The Resource Exchange Network for Eliminating Waste is a materials exchange. It matches businesses or individuals who have surplus waste with those that can reuse or recycle it. It is a free, quarterly catalog distributed to 5,600 subscribers, and is now available on the Internet. The RENEW program was created by the 70th Legislature in 1987. Users of RENEW have diverted from disposal more than **660 million pounds of materials for reuse or recycling, and saved \$2.4 million.**

RESULTS

RENEW Catalog

***RENEW On-Line.** Kyle Kutach, the environmental health and safety manager at Mentor H/S Inc. is taking advantage of RENEW's Web page. Mr. Kutach reported that the day after he posted a listing to the RENEW Web site, he received a phone call from a company that wanted all his scrap plastic sheeting. Eight hundred pounds of material were kept out of the landfill.*

Workplace Waste Reduction and Recycling

The commercial sector, which generates about half of the municipal solid waste stream, represents the state's greatest opportunity for significant waste reduction and recycling gains. A survey of Texans found that 66 percent said they do not have access to a recycling program at work, yet most (89 percent) said they would participate if they had one. Workplaces benefit through waste reduction and recycling practices because they **improve operational efficiency, save money on disposal costs, involve employees, and establish a record of environmental stewardship.** The OPPR's Workplace Recycling program provides technical assistance through direct consultation, training, publications, and fostering networking and mentoring opportunities.

RESULTS

Workplace Waste Reduction and Recycling

Presented school recycling workshops at 20 regional centers serving several hundred school districts in 1995 and 1996, and at four universities: University of Texas at Austin, Texas Tech University, University of Texas-El Paso, and Blinn Junior College. Co-sponsored EPA-funded border recycling workshops in Piedras Negras, Ciudad Acuna, Nuevo Laredo, and Juarez, which targeted Texas-Mexico partnerships. Average attendance at each was 125. Conducted a site assessment of the recycling program at the

Capitol complex in Austin with the General Services Commission.

Workplace Partnership. Site assistance visits are being conducted by TNRCC staff at several of Trammell Crow's Dallas facilities, including large office towers, warehouses, hotels, a medical complex, and apartment buildings. Workplace waste reduction and recycling programs are being implemented at all Trammell Crow companies.

Workplace
Waste
Reduction and
Recycling

Waste Reduction at the Texas Department of Criminal Justice. Significant results have been achieved through a partnership with the TDCJ:

- *Cotton recycling, one million pounds of cotton will be recycled each year. The fabric waste reclamation line (ragpicker) is being leased for purchase through the Bond Review Board. Projected savings are \$1 million each year, with a six-month payback on investment.*
- *Cardboard bailer saves \$52,000 each month, with a three-month payback on investment.*

Recycling Market Development

Through publications, seminars, training sessions, and direct consultation, the Recycling Market Development program initiates activities to develop and expand recycling markets. The TNRCC **helps customers locate and access markets for recyclable materials**, leveraging resources through public/private partnerships, and developing cooperative marketing systems for recyclables. The program also supports the Recycling Market Development Board and promotes programs to increase the purchase of recycled-content products. Following are examples of activities undertaken to boost Texas markets for recyclables.

- Rural communities in West Texas, the Panhandle, and Central Texas gain access to both processors and end-markets for recyclables through **grant assistance** from the TNRCC, the Southwest Public Recycling Association, and the Central Texas Recycling Association.
- **Market News**, a monthly newsletter with more than 3,000 subscribers, features articles on specific recycled materials, business trends, and current market prices. It is available on the Internet.
- **Recycle Texas: A Directory of Recycling Companies** provides information on more than 900 collectors, processors, brokers, and manufacturers. Last year, approximately 4,500 copies were distributed.
- Through a contract with the University of Texas Bureau of Business Research, the OPRP has **identified current and potential markets for recycled materials at manufacturers in the state**. In early 1997, the database will be available for queries targeting specific industry groups or specific regions of the state for market development initiatives.

- The TNRCC co-sponsored the “Road to Recycling Conference” in January 1997 with the Texas Department of Transportation highlighting the use of glass cullet, fly ash, asphalt shingles, scrap tires, and recycled plastics in roadway construction. The program responds to approximately **1,800 requests annually for markets information** from generators and from internal and external customers.

RESULTS

Recycling Market Development

*Texas Instruments buys 17 products made from recycled materials each year. The company recycles 42,039,000 pounds of nonhazardous materials annually. Through recycling, reuse, and source reduction, Texas Instruments saved 477,914 trees, 228,280 cubic yards of landfill space, 3.1 million gallons of oil, 196.8 million gallons of water, and 115.2 million kilowatt-hours of electricity. In 1995, Texas Instruments **recycled 74 percent of their nonhazardous waste diverting it from landfills.***

***Matching Texas and Mexico Recycling Markets.** In November 1996, Golden Aluminum of San Antonio, purchased its first one-half million pounds of aluminum from Mexican processors as a result of attending Mexico’s National Recycling Annual Conference. Golden Aluminum operates a state-of-the-art sheet aluminum plant, employing 250 workers, processing about 170,000 tons of recycled aluminum annually. The TNRCC’s OPPR is continuing its efforts by assisting companies, such as Polimeros Compuestos, a plastic manufacturer in Monterrey, Mexico, with setting up plastics recycling plants in Texas.*

***Recycling in Texas Creates Jobs and Increased Economic Activity.** A recent analysis conducted by Roy F. Weston, Inc., for the Southern States Waste Management Coalition found that recycling processors and manufacturers employ 20,000 Texans. The study also found that the recycling industry, including processing and manufacturing firms, adds \$2.8 billion in value to the Texas economy annually through the upgrade of recycled materials.*

Examples of **private investment in recycling processing and manufacturing in Texas** include the following:

- Champion International invested \$100 million in constructing a de-inking mill (for newspapers and magazines) and processing plants in Houston, Arlington, and San Antonio.
- Corrugated Services Inc. in Forney spent \$67 million to triple the capacity of its liner board mill, which uses 100 percent recycled-content materials; the company now uses 700 tons per day of recycled paper.
- In the last two years, eight new Materials Recovery Facilities (MRF) were constructed in Texas, and nine others have expanded. The cost of these expansions is estimated to exceed \$40 million.

CLEAN INDUSTRIES 2000

CLEAN INDUSTRIES 2000 is a voluntary program through which members receive technical assistance and public recognition in their communities. Members are recognized as leaders for making voluntary commitments to reduce hazardous waste. The program is open to any Texas industrial facility that commits to cutting in half, by the year 2000, its generation of hazardous waste and/or release or transfer of pollutants. Members also develop an internal environmental management program, sponsor community environmental projects, and hold regular public forums for citizens on environmental issues.

The 147 members are well on their way to achieving their commitments. Between 1992 and 1994, members reduced the generation of hazardous waste by 15.3 million tons. They sponsor 515 community environmental projects, and participate in 152 citizen communication programs. Community environmental projects include:

- 154 environmental education projects
- 54 environmental committees
- 34 environmental quality monitoring programs
- 47 hazardous waste collection programs
- 66 cleanup programs
- 29 earth day sponsorships
- 32 nature preserves projects
- 42 scholarships, donations, or internships



CLEAN INDUSTRIES 2000 citizens communications programs include:

- 90 citizen advisory panels
- 30 open house or town meetings
- 32 ombudsmen programs

RESULTS

International Paper of Texarkana, winner of a 1996 Governor's Award for Environmental Excellence and a CLEAN INDUSTRIES 2000 member, worked to make its pulp bleaching process the most environmentally friendly in Texas starting in 1990. Although these changes were not dictated by regulatory requirements, the facility invested more than \$75 million to phase in a five-year bleaching improvement program. They cut chloroform emissions by 88 percent, reduced the dioxin in its treated effluent to undetectable levels, and reduced water demand by 5 million gallons per day.

**Clean
Industries
2000**

CLEAN TEXAS STAR

CLEAN TEXAS STAR offers members public **recognition for reduction of nonhazardous industrial or municipal solid waste**. Three thousand Texas businesses, schools, and institutions are members. It is the largest and fastest growing program of this type in the country. Members set waste reduction goals, commit to buying recycled-content products, and participate in community environmental events. The program maximizes efforts by developing a network of partners, who are members that help recruit new members and recognize their achievements. Members tripled their recycling rate in 1995, the first year of the program.

RESULTS

CLEAN
TEXAS
STAR

HEB Grocery Company, a charter member of CLEAN TEXAS STAR, made a commitment to reduce waste disposal by 50 percent and to buy recycled products. The result was that HEB diverted 140 million pounds of materials and avoided significant disposal costs. The company's milk jug production line diverts almost 50,000 pounds of plastic a week from Texas landfills. This unique recycling partnership program employs mentally challenged citizens to process the material for recycling into milk crates, which HEB buys back, thus closing the recycling loop.

CLEAN TEXAS STAR member Anheuser Busch of Houston saves millions of dollars each year by recycling more than 300 million pounds of material.

PARTNERSHIPS

CLEAN
TEXAS
STAR

The Houston Corporate Recycling Council recruited 900 new members for the CLEAN TEXAS STAR voluntary waste reduction program, bringing total membership to 3,000 in the two years of the program's existence. Some of these new members have several facilities that participate.

The Houston Independent School District has 261 facilities. HISD spent \$541,710 on the purchase of recycled content products in 1996, and has recycled, reused, or reduced over 1,300 tons of waste in the past quarter year.

The Houston District of the U.S. Postal Service has 264 facilities that have increased their purchase of recycled content products from 10 percent in 1993 to 50 percent in 1996. They have also implemented a district-wide recycling program for all undeliverable third and second-class mail.

Local Governments and Community Groups

Because every community is different, strategies are developed for the specific needs and resources of each. Through technical assistance, recognition, and public education, TNRCC programs can establish a structure where pollution and waste prevention are the primary focus. This section describes programs that provide communities a foundation for preventing pollution.

Community Waste Prevention and Recycling

Through workshops, publications, on-site assistance, and direct consultation, the TNRCC's OPPR assists local solid waste decision makers in planning and implementing efficient and effective voluntary programs to reduce the residential waste stream. The program offers a full range of technical assistance including:

- cost-benefit analysis of various waste management options
- leveraging resources through public/private partnerships
- improving the efficiency of solid waste and recycling operations
- source reduction strategies such as “Don’t Bag It” and backyard composting programs
- effective, low-cost public education utilizing in-house resources, media, and volunteers
- locating and accessing markets for recyclable materials

One hundred and thirty Texas cities currently provide curbside recycling collection to about 1.5 million single-family households. In fiscal year 1996, 382 Texas cities and counties offered citizens some type of recycling program, up 45 percent from 1995. Twenty-six cities provide recycling collection services to apartment complexes. More than 100 cities and 11 counties have drop-off or buyback recycling services.

RESULTS

***Lubbock:** Following a site assistance visit to Lubbock’s solid waste management operations in October 1996, the city adopted recommendations to optimize the efficiency of its residential solid waste collection the city will service its outdoor trash containers in residential alleys once a week instead of twice a week. The city has also begun to explore cost-saving options for its residential recycling program and expansion of its compost operations.*

**Community
Waste
Prevention and
Recycling**

Large-Scale Centralized Composting

Large-scale centralized processing of yard trimmings and other organic material into compost is a **growing industry in Texas**. The TNRCC's OPPR provides technical assistance and training on recovery, processing, and marketing strategies to maximize the beneficial reuse of these materials and ensure voluntary compliance with environmental laws. Recipients of these services include local governments; commercial composters; and high-volume generators of agricultural

wastes, yard trimmings, food, and other organic material. Educational outreach and assistance offered by the TNRCC includes workshops, publications, and direct consultation on current compost regulations, market developments, and referrals to both public- and private-sector applications for composted materials.

At the end of 1995, 153 cities and counties reported that they compost or mulch brush and other organic material on a community-wide scale (an increase from 58 cities in 1993). About 140 local governments provide curbside collection of yard trimmings. There are 40 commercial composting operations in the state, twice as many as existed in 1990. Twenty-six cities reported mixing biosolids with yard trimmings in 1995. In order to assure markets for the materials, the TNRCC supports research on potential uses for the materials.

Backyard Composting

Twenty-five cities manage home composting programs in conjunction with the TNRCC's Master Composter program, educating more than 3,000 citizens thus far about backyard composting, and diverting about 1 million pounds of yard trimmings from landfills each year. A follow-up survey of five Master Composter workshops conducted in fiscal 1995 and 1996 showed that 20 new programs were implemented, 9 existing programs were expanded or enhanced, and 15 new grant applications were accepted.

PARTNERSHIPS

Backyard Composting

TNRCC and TPWD Team up on Composting. Scout troops, hikers, campers, students, and families can learn how to turn brush, yard trimmings, and table scraps into useful compost in their own backyards, under a new joint project between the TNRCC and the Texas Parks and Wildlife Department. Staff from 10 state parks will receive the TNRCC's Master Composter training and will establish composting demonstration sites to process 100 percent of the brush and organic materials generated at participating parks. The resulting compost will be used to add nutrients to sites around the parks. Park visitors will learn composting skills at the demonstration sites to use in their own backyards.

Solid Waste Assistance Partnerships (SWAP)

In 1996, the TNRCC created **SWAP to give communities a comprehensive waste reduction plan tailored to meet their particular needs.** SWAP addresses not only the technical and economic aspects of a community's waste management programs, but also the decision-making processes and the management structures that implement and maintain them. This approach is viewed as a model for future comprehensive community waste reduction and recycling efforts.

In an intensive three-day session, or SWAP Meet, TNRCC staff members from the Recycling Section, and from the CLEAN CITIES 2000 and CLEAN TEXAS STAR programs interact closely with key players in the public, private, and volunteer sectors of a selected community. The SWAP Meet, which includes an information-gathering, team-building, and planning process, results in a waste reduction Plan of Action. The local team continues to function, ensuring implementation of the plan.

Big Spring First in SWAP. The first SWAP took place in Big Spring, Texas. The city's impressive planning efforts resulted in their commitment to reduce waste going to the landfill by 50 percent and being named a member of CLEAN CITIES 2000 on Texas Recycles Day (November 15).

Solid Waste
Assistance
Partnerships
(SWAP)

Grants Assistance

State grant resources were reallocated to regional Councils of Governments (COGs). The TNRCC provides these regional and local officials with grant training and technical assistance in program planning, management, evaluation, and reporting. The **grant funding supports efforts to reduce waste generation and increase recycling and composting**. TNRCC staff also help regional officials assess local grant proposals.

One hundred eighty-seven municipal solid waste grants totaling \$5.2 million were awarded by the regional COGs for residential recycling programs for fiscal 1996 and 1997. One hundred forty-six grants totaling \$4 million were awarded for home and centralized composting.

Partnering for Recycling. The TNRCC maximizes waste reduction and recycling efforts by providing resources and technical training to regional partners, who in turn train local governments and individuals. Partners included regional Councils of Governments (COGs), and their umbrella organization, the Texas Association of Regional Councils (TARC), as well as the Texas Municipal League and the Texas Association of Counties. Participants of three TNRCC Centralized Composting Workshops, conducted in partnership with the COGS, were surveyed one year later. Participants had implemented 10 new composting programs, expanded or enhanced 12 programs, and submitted 12 successful grant applications. (Centralized composting is large-scale composting at a central location in a community.)

Grants
Assistance

Recycling at School

The TNRCC has helped start and sustain recycling in schools, by providing training and technical assistance. Staff provided workshops to 17 of the state's 20 regional service centers in 1995-96. University Recycling Workshops were also conducted in 1995 and 1996, with attendees from the University of Texas at Austin, Texas Tech University, the University of Texas at El Paso, and Blinn Junior College.

The Plano Independent School District reports that they saved \$100,000 in avoided disposal costs since they started recycling in 1991. Plano schools replaced oversized containers and reduced waste pickups by diverting 800 tons of material from landfills. In addition to paper and cardboard, the district recycles plastics, steel, and aluminum cans.

Recycling at School

Recycling Market Development

The TNRCC helps cities access markets for the recyclables they collect. In 1994, the city of Gainesville, population 14,256, earned more than \$30,000 for its recycled materials and developed a partnership program to bale the materials in association with the Texas Youth Commission's juvenile work-release program.

CLEAN CITIES 2000

This is a voluntary program that gives technical assistance and public recognition to cities that commit to cutting solid waste disposal in half by the year 2000. Cities with populations more than 50,000 receive special recognition for preventing air and water pollution, and offering public education programs. Currently 67 cities in Texas are members of CLEAN CITIES 2000. This program now reaches 6 million people in Texas. **Members diverted more than 336,500 tons of municipal solid waste and saved \$10 million in avoided landfill disposal costs in 1995.**

PARTNERSHIP

CLEAN
CITIES
2000

Brazoria County Clean Cities Partnership. *The Southern Brazoria Clean Cities Coalition consists of five municipalities in Brazoria County (Clute, Lake Jackson, Quintana, Sweeny, and Surfside Beach) located on the Gulf Coast. Working with a private company, the communities opened a material recovery facility in Lake Jackson so that businesses and residents could have convenient recycling services. The cities work together to save tax dollars through this cooperative effort. The partnership processes recyclables, provides recycling drop-off centers, manages yard trimmings, offers workplace recycling collection, collects used motor oil, and provides public education.*

Recycling More, Landfilling Less. *The city of Crockett, population 8,300, reports some remarkable recycling results: in 1995 the city recycled more materials than it sent to landfills. Crockett shipped the following recyclables to market in 1995: 160 tons of newspaper, 252 tons of cardboard, 43 tons of plastic, 6 tons of aluminum cans, 72 tons of tin cans, 94 tons of glass, and 312 tons of yard waste.*

*FPO
Plano Waste
Diversion*

All Texans

All Texans play a critical role in improving the environment, whether at home, at work, or out in the community. Individual actions taken collectively can and will have a significant impact on the environment. Recognizing this critical role, the TNRCC's OPPR has committed significant resources to not only educating Texans, but also providing hands-on activities that they can participate in to truly make a difference. This section describes some of the programs offered and their results.

CLEAN TEXAS REPORTER

The CLEAN TEXAS REPORTER is a series of syndicated environmental news segments airing on local news broadcasts. The segments offer viewers practical tips on environmental protection, including car pooling for cleaner air, shopping for recycled products, leaving lawn clippings rather than bagging them, conserving water in the bathroom, composting food scraps, and maintaining cars for cleaner air. **The CLEAN TEXAS REPORTER reaches 1.8 million Texas households.** The segments are broadcast in eight media markets.

RESULTS

Citizens in Laredo can watch for Cathy Conley, the CLEAN TEXAS REPORTER, on station KGNS, Big 8 News. The segments are made possible by sponsorships from the Recycling Coalition of Texas and the city of Laredo's Recycling Program. Laredo's recycling coordinator reported a jump in recycling activity since the news segments began airing.

CLEAN
TEXAS
REPORTER

Creative Financing

The CLEAN TEXAS REPORTER was developed by asking TV stations to pay for an exclusive license to broadcast the segments in their market. Funds raised with the licensing fee are used to continue video production of additional segments. According to advertising cost estimates, the TNRCC would have to pay more than \$3.5 million to purchase similar advertising exposure.

Texas Recycles Day

To increase public awareness about the environmental and economic benefits of recycling, the TNRCC launched Texas Recycles Day. **Every November 15**, Texans have an opportunity to get involved in special recycling events all over the state. In 1995, 90 percent of communities that organized an outreach event for Texas Recycles Day noticed an increase in recycling from the previous year. For example:

- the city of Austin's curbside recycling rate jumped 16 percent in one month after several businesses and groups sponsored Texas Recycles Day events, at a time when the recycling rate usually dropped
- the city of El Paso conducted a promotion on recycling "junk mail" and noted an 800 percent increase in volume collected
- In 1996, more than \$290,000 in radio air time was donated by the Texas Association of Broadcasters stations for Texas Recycles Day public service announcements.

Texas Recycles Day Events and Pledges

Texas Recycles Day Events

1994	160
1995	200
1996	301

Texas Recycles Day Pledges

1994	4,000
1995	82,000
1996	145,000



PARTNERSHIPS

Texas Recycles Day

Partnerships Spark Recycling. The Texas Recycles Day Steering Committee is made up of more than 100 business, community, and government leaders. In 1996, the steering committee was headed by Betsy Howie, president, Keep Texas Beautiful, and Ben Hernandez, Amoco Corporation. Lt. Gov. Bob Bullock, Senator J.E. “Buster” Brown, Senator Rodney Ellis, and Representative Robert Saunders served on the committee. Business partners contributed a Jeep, grocery and home improvement gift certificates, a laptop computer, and other in-kind donations to help encourage recycling in Texas.

Lake and River Cleanups

The program reduces litter and garbage illegally dumped on public lands and in public waters across the state. The lake and river cleanup team members organize volunteers from civic organizations, private companies, schools, youth groups, and individuals to clean up the waters and shorelines of Texas. The program increases awareness and public participation, and educates citizens about nonpoint source pollution.

RESULTS

Lake and River Cleanups

*In fiscal 1996, 53 lake and river cleanups were held, with **23,077 volunteers collecting 513 tons of litter and debris.** The totals for the biennium, fiscal 1995 and 1996, are: 100 lake and river cleanups, with 42,877 volunteers collecting 985 tons of litter and debris.*

Trash Bash. The TNRCC's Texas Cleanup Program and the Valley Proud Environmental Council conducted a series of cleanup events throughout the lower Rio Grande Valley as part of the **Valley-Wide Trash Bash**. **Over a one-week period**, the following materials were collected: 7.3 tons of household hazardous waste; 42.8 tons of agricultural waste pesticides; 14,135 empty pesticide containers; 803 automobile tires; 215 tractor tires; 1,640 gallons of used oil; 4,500 used oil filters; 204 automotive batteries; and 25 tons of litter and recyclables from the rivers.

Lake and
River
Cleanups

Texas Country Cleanups

To divert waste from landfills that is specific to rural and agricultural communities, the Rural and Agricultural Waste Management Program conducts Texas Country Cleanups. The one-day collections across the state are at temporary sites and **offer recycling outlets for empty pesticide containers, waste oil, oil filters, batteries, and tires**. At selected collection events, banned or canceled pesticides are collected to prevent injury from exposure and contamination of drinking water supplies. The Texas Agricultural Extension Service and the Texas Department of Agriculture work with the TNRCC as partners. The program also educates its customers on the proper storage and disposal of waste pesticides.

RESULTS

In fiscal 1996, agricultural pesticides were collected from 366 participants at three locations, La Feria, Circleville, and Stanton, and 186.26 tons were collected. Since the beginning of the TNRCC's agricultural waste pesticide collections, 25 events have been held, collecting 975 tons of waste pesticides from 2,061 agricultural producers. In fiscal 1996, the TNRCC conducted 41 Texas Country Cleanup/Empty Pesticide Container Recycling collections. At these events, 1,347 rural and agricultural producers brought in 57,380 empty pesticide containers; 13,009 automobile tires; 1,381 tractor tires; 27,620 gallons of used oil; 46,670 oil filters; and 3,152 automotive batteries. Since this program began, there have been 178 collections serving 4,651 rural Texans.

Texas
Country
Cleanups

Household Hazardous Waste Collections

Household hazardous wastes (HHW) can be legally disposed of in municipal landfills. However, the material can contaminate groundwater and adjacent property. The HHW collection program provides technical assistance to communities interested in diverting such waste from landfills by collecting it, managing it properly, and by educating the public about alternative products. Once household hazardous wastes are collected, they are regulated. Program staff provides regulatory oversight of local collection programs and technical assistance in planning and implementing collection events and permanent facilities.



RESULTS

Household Hazardous Waste Collection Events

In 1996, 60 household hazardous waste collections were held, and 30,854 participants brought in the following materials: 744,163 pounds of hazardous waste; 722,253 pounds of hazardous paint; 419,574 gallons of recycled paint; 7,848 automotive batteries; 5,303 gallons of antifreeze; 14,207 tires; 14,991 oil filters; and 44,906 gallons of used oil.

*In the past two years, public participation in these events has increased by 90 percent over the previous two years, and **hazardous-material recovery has risen by 31 percent.***

TRI Community Workshops

The TNRCC's OPPR created a community environmental workshop to explain the data and related information that can be obtained over the Internet from the Toxics Release Inventory. The workshop teaches participants **how to access the information and how the data can be used** to increase community understanding of toxics in the environment. The workshops offer hands-on computer training.

Teaching Environmental Sciences (TES)

This program provides school children all over the state with balanced environmental information and skills they can use throughout their lives. Partnerships are formed with Texas universities to provide classrooms and courses for teachers. **Teachers earn three credit-hours toward a graduate-level program.** In 1996, 115 teachers took the TES course at six universities. The program will expand to nine universities in 1997: Lamar University at Beaumont, Texas Southern University in Houston, University of Houston at Clear Lake, Texas A&M University at Corpus Christi, University of Texas at El Paso, Stephen F. Austin State University at Longview, University of North Texas at Denton, Southwest Texas State University in San Marcos, and Texas Tech University in Lubbock.

Teachers receive resource materials, science-based lectures from TNRCC and university staff, and field trips to local industries to see "real world" applications of the issues covered in the course. Armed with this knowledge, each participant writes three lesson plans, which the TNRCC distributes to teachers statewide.

Each TES participant directly affects hundreds of students in his or her classroom after taking the course, while the lessons reach thousands of additional teachers and students through TNRCC's distribution. More than 8,000 copies of the first lesson plan book were distributed in the first six months following publication.

RESULTS

Teaching Environmental Sciences

TES Partners Give Teachers Special Opportunities. TNRCC staff members organize the TES courses, and local partners from business, industry, and the sponsoring university provide funding for tuition, supplies, written materials, and classrooms. Local partners also provide field trip opportunities, suggestions for topics to study based on local community concerns, and speakers.

Governor's Awards for Environmental Excellence

Each year, every business, industry, local government, school, civic organization, and resident of Texas is eligible to apply for an award, which is presented by the Governor. Applicants must undertake or complete one environmental project. A blue-ribbon committee selects the finalists. Winners are selected each year by the Governor and the TNRCC commissioners. Winning programs receive statewide publicity, which **increases public awareness of excellent programs that work to measurably improve the Texas environment.**

RESULTS

***Learning to be Water-Wise and Energy-Efficient.** The Harris-Galveston Coastal Subsidence District in Friendswood, Texas won a 1996 Governor's Award for Environmental Excellence for their project that created partnerships to conserve water. Working with public and private watersuppliers, and with school districts, the Coastal Subsidence District initiated a water conservation education program in 34 school districts. The Subsidence District estimates that 40,000 fifth-graders who participated during the 1995/96 school year saved about 672 million gallons of water and wastewater, and will continue to do so each year thereafter.*

***Houstonian Recognized for Individual Effort:** Dee Owens of Houston, winner in the Individual Category in 1996, realized she was living next to a "floating garbage dump" and decided to do something about it. Dee brought together nearly 30 local, county, and state agencies to help. The alliance used people on probation as "bayou crews" to clean up the waterways around Houston, including parts of the Houston Ship Channel. The project not only cleaned up waterways, but also gave probationers new skills that could lead to future employment opportunities.*

**Governor's
Awards for
Environmental
Excellence**

Regulatory Innovation

In order to make significant strides in the future, opportunities to reduce regulatory barriers and identify incentives for pollution prevention must be identified and acted upon. The TNRCC's OPPR is working to increase the integration of voluntary pollution prevention opportunities into all operations of the agency. The program is making it a priority to identify and help eliminate certain regulatory processes that can act as barriers to pollution prevention. Although current regulatory and voluntary programs have achieved measurable results, much more can be achieved by integrating innovative and voluntary prevention efforts into regulatory processes.

Integration

The TNRCC will expand efforts begun in 1996 to integrate pollution prevention into all aspects of the agency's functions.

Field Inspections

A pilot project was undertaken at three **TNRCC regional field offices, integrating pollution prevention opportunities into the inspection process**. More than 60 inspectors were trained at the Beaumont, Arlington, and El Paso field offices about OPPR services. One early result was a referral for services a request for technical assistance from a hazardous waste generator seeking solvent alternatives which will reduce the facility's generation of waste and move it from a "Large Quantity Generator" to a "Small Quantity Generator."

In addition, OPPR is working cooperatively with field operations staff as they develop a new initiative to explore an alternative compliance and enforcement program for companies that continually demonstrate high levels of compliance and that have certified Environmental Compliance Management Systems. The project could result in cost savings for the agency and industry while maintaining public accountability for environmental compliance.

Consolidate Reporting

Reporting on various environmental activities can be a burden for businesses, since the same facility may be subject to reporting requirements from several TNRCC and federal programs. In order to be more "user friendly" the TNRCC has begun a Consolidated Uniform Report for the Environment (CURE). The project is designed to:

- streamline reporting for facility managers
- collect data that communities, organizations, and stakeholders will actually use
- benefit managers through less burdensome reporting requirements
- benefit the TNRCC by receiving more timely and accurate information
- provide the public greater access to information that is presented in nontechnical, understandable terms

The program is making it a priority to identify and help eliminate certain regulatory processes that can act as barriers to pollution prevention.

Regulatory Development

A pollution prevention analysis is now required for all agency rules and policies as part of the TNRCC's rules development process. Each rulemaking is reviewed to determine multimedia impacts and opportunities to incorporate pollution prevention. This approach encourages staff to consider flexibility at the earliest stages of regulatory development.

Regulatory Integration Training

The TNRCC recently established a new training course, Regulatory Flexibility and Pollution Prevention Opportunities for TNRCC Staff, to encourage staff to integrate pollution prevention into their daily regulatory functions.

Permit “Threshold” Project

The TNRCC's OPFR and the Emissions Inventory Division are working together to develop an emissions “threshold” project. The project provides pollution prevention technical assistance to industrial facilities that are just over emission threshold levels, thereby requiring them to obtain an air permit from the TNRCC an expensive proposition. Working with these companies to get them below threshold levels will save them the money and time it takes to obtain a permit. The agency benefits by avoiding the use of resources necessary to process permits and conduct administrative hearings.

Working with these companies to get them below threshold levels will save them the money and time it takes to obtain a permit.

Regulatory Incentives

Staff from TNRCC's OPFR and air, water, and waste programs are working to identify regulatory incentives for the voluntary waste reduction program, Clean Industries Plus. This project should result in the identification of proposals designed to help leverage TNRCC resources, encourage regulatory innovation, and promote improved environmental performance by industry.

Texas/Mexico Border Pollution Prevention Initiative

Texas has the longest border with Mexico of any of the United States. Four of Mexico's six northern states border on Texas: Tamaulipas, Nuevo Leon, Coahuila, and Chihuahua. All four are experiencing rapid industrial growth, with the number of maquiladoras growing by approximately 10 percent each year.

The four border states have 1,521 maquiladora plants, which assemble products from United States and Canadian components for re-export. Of these, 596 plants are located in six Mexican border cities adjoining Texas; they employ 304,384 workers. Under the terms of the La Paz Agreement, a 1983 environmental treaty between the United States and Mexico, waste generated by maquiladoras from United States components and materials must be returned to the United States for treatment, storage, and disposal. The Mexican Attorney General for the Environment estimates that 53 percent of maquiladora waste is returned to or through Texas.

Build Local Capacity

Because of unique environmental challenges along the border, the Texas/Mexico Border Region Pollution Prevention Initiative was developed. It was designed from the beginning with a built-in nationalization component so that the training and technical assistance provided by the TNRCC will be replaced by local providers.

The project is also unique in its use of market-based approaches in an international setting. To encourage and sustain pollution prevention and recycling activity, **the initiative targets cost savings through source reduction, reuse of wastewater, and generation of income from selling recyclables.**

Joint Audits

The TNRCC project began in 1993 with a series of joint audits conducted at selected maquiladoras with the Mexican Attorney General for the Environment (PROFEPA). PROFEPA selects specific industrial sites and then invites **TNRCC staff and plant managers to join in a pollution prevention assessment.** Recommendations are then provided to Mexican officials and plant managers.

Implementation of recommendations from seven joint PROFEPA/OPPR voluntary audits during 1995 and 1996 showed the following:

- a reduction of 7,009 tons of hazardous waste
- a reduction of 14,445 tons of nonhazardous waste
- a savings of 4.5 million gallons of water
- a savings of 5.3 million kilowatt-hours of electricity

The seven participating maquiladoras saved \$4 million. PROFEPA officials have since added a pollution prevention segment to their audit program, and are discussing future expansion of the program with OPPR staff.

Waste Reduction Workshops

The TNRCC and Mexican state environmental agencies presented a series of municipal solid waste management and recycling workshops along the Texas/Mexico border, targeting the cities of El Paso/Juarez, Eagle Pass/Piedras Negras, and Laredo/Nuevo Laredo. The aim of these workshops was to **develop effective regional partnerships, strengthen the recycling infrastructure, and find lasting solutions to regional solid waste problems.**

Workshop participants included representatives from Texas and Mexico from the private sector, municipal government, nonprofits, and schools. The OPPR is assisting the Councils of Governments along the border with accessing federal funds (from EPA) to strengthen their recycling capacity.

The TNRCC and the Center for Environmental Quality (CEQ) of the Monterrey Institute of Technology jointly implemented a **satellite broadcast training course** in 1995 that was down linked to eight border communities. Local downlinks were provided by CANACINTRA, a Mexican trade association. The broadcast was seen by 330 participants. The CEQ has since obtained funding to provide the course to mid-sized and small manufacturers in the Northern Mexican states.

International Market Development

In 1995, the OPPR held a conference in San Antonio, Beyond the Border: Accessing Recycling Markets in Mexico, to educate Texas recyclers about recycling markets in Mexico. The conference was the culmination of research by the TNRCC and ERM-Southwest on markets in Mexico for paper, glass, plastics, and steel cans. The following are results of the conference and continuing TNRCC market-development efforts:

- Rock-Tenn, a large Texas manufacturer of paperboard made from 100 percent recovered paper, is exporting 600 to 800 tons of recovered paper to Mexico.
- El Porvenir, a company in south Texas, has located markets in Mexico for 300 tons of paper, plastics, and cardboard. El Porvenir bales and transports Texas recovered materials and then locates markets in Mexico for them.

Goals for the Future

Over the past five years, the TNRCC's Office of Pollution Prevention and Recycling has built a strong foundation for assisting industry, business, communities, and individual Texans with identifying and implementing opportunities to reduce waste and pollution. Significant goals have been developed and achieved, training and on-site technical assistance have been provided, and incentive and recognition programs have been created. Each of these pollution prevention (P2) programs allows customers to make progress towards reducing their impact on the environment, while often improving economic performance.

Many opportunities exist to build on the success achieved so far. As the TNRCC's OPPR moves forward, its focus will be to:

- increase the technical assistance and partnerships that help customers develop their own programs
- develop programs that allow TNRCC to track real environmental progress
- identify and overcome barriers to pollution prevention, and increase regulatory flexibility
- shift the primary focus of environmental programs towards prevention and away from management and control

Technical Assistance: Build Local Capacity

To maximize limited resources, opportunities must be created to build capacity within other organizations so they can **identify and implement their own P2 opportunities**. In order to facilitate this capacity, the OPPR will:

- provide comprehensive community-based technical assistance through the new Solid Waste Assistance Partnerships (SWAP) program, which promotes a comprehensive approach and local ownership of community waste reduction programs
- build on the Permanent Pollution Prevention Program (P4), which provides technical assistance that encourages the development of sustainable, system-wide pollution prevention programs in industry
- develop partnerships that maximize state resources and encourage organizations to take ownership of pollution prevention and recycling programs, thereby increasing their sustainability and decreasing the need for state government resources
- continue to identify opportunities that meet the needs of our customers in achieving economic growth and environmental excellence

What Gets Measured Gets Done

In order to raise community awareness about the full benefits of reducing and recycling waste, the agency will help communities determine and evaluate the true cost of their solid waste management programs. **Improved data analysis, measurement, and accountability will be the key focus.** Customers include a broad spectrum of public and private entities, from state and regional government to major corporations, large and small cities, small businesses, school districts, and private citizens. They all want the same basic information: the options, the costs, and the benefits. However, many customers are unable to gather complete information or to calculate the true costs associated with their programs. The following initiatives will help customers make informed decisions:

Develop and Implement Full-Cost Accounting

Full-cost accounting helps communities evaluate the true costs of their present and proposed solid waste management programs. It assures complete evaluation of the cost effectiveness of an integrated set of solid waste services. OPPR encourages taking a regional approach to this analysis through regional Councils of Governments to develop software and training programs.

Support Tracking of Municipal Solid Waste by Weight

Only half of the municipal solid waste landfilled in Texas is weighed. To landfill customers, weighing offers assurance that tipping fees are based on an objective, equitable standard; accurate information on the effectiveness of their waste reduction programs; and valuable information with which to improve efficiency. Weighing also offers customers opportunities for reduced disposal costs through recycling, reducing, and reusing strategies.

Texas is one of four states unable to report an overall recycling rate.

Support Tracking Municipal Solid Waste by Origin

In order to give local and regional governments a clearer picture and a powerful planning tool, the TNRCC supports the collection of information that will track the origin of the wastes received at landfills. This will give local governments a clearer picture and more powerful planning tool.

Develop Mechanisms to Accurately Track Recycling Rates and Measures

Texas is one of four states unable to report an overall recycling rate. Because there is no mechanism to gather recycling activity by business and industry which generates, processes, and consumes the majority of recyclables in Texas the TNRCC is working to develop a public/private partnership to provide accurate information on the amounts, types, and sources of recyclables generated in the state.

Shift towards Prevention, away from Control

A window of opportunity exists like never before to address environmental concerns in a proactive and innovative manner. Over the last five years, pollution prevention has proven to be an extremely effective tool in reducing environmental impacts while increasing efficiency and cost-effectiveness. The foundation is in place. Now is the time to make it the framework for future environmental policy. To make prevention a priority in protecting natural resources in Texas we must:

- identify and act on opportunities to integrate prevention into regulatory processes
- identify incentives for and barriers against pollution and waste prevention both in the marketplace and throughout the existing regulatory structure
- seek flexibility from the EPA to allow the TNRCC the discretion to use EPA air, water, and waste grant funds for pollution prevention
- create a structure that provides regulated industries with the flexibility to achieve their environmental goals while improving performance and increasing public participation

Appendix A: Office of Waste Exchange

At the direction of the 73rd Legislature, the Texas Natural Resource Conservation Commission (TNRCC) created the Office of Waste Exchange (OWE) to assist industries, businesses, local governments, and other entities in exchanging solid and hazardous wastes and recyclable materials, in order to help divert waste from the state's landfills. THE OWE emphasizes the use of market-based incentives, public recognition for voluntary efforts, and technical assistance as its primary tools for encouraging more Texans to reduce, reuse, and recycle their waste. The OWE is administered by the TNRCC's Office of Pollution Prevention and Recycling (OPPR). The programs that make up the OWE are the Resource Exchange Network for Eliminating Waste (RENEW), the CLEAN TEXAS STAR program, the technical assistance programs, as well as recycling and market development activities.

RENEW is a free, materials exchange network that provides an opportunity for industries to sell surplus materials, by-products, and wastes to users who will reclaim or reuse them. From 1988 to 1996, RENEW facilitated the transfer of 660 million pounds of material for reuse and recycling. The RENEW catalog has more than 5,600 active subscribers, contains 1,039 material listings, and since its inception on September 1, 1988, has received more than 8,000 inquiries. RENEW subscribers calculate that the service has helped them save approximately \$2 million in disposal costs and earned \$441,428 from the sale of waste materials over the past nine years. RENEW is available online and also carries listings for the TNRCC's Emissions Credit Trading Bank, a market-based incentive program to encourage industries to voluntarily reduce air emissions.

The **CLEAN TEXAS STAR** is a voluntary waste reduction program that recognizes organizations of all types (businesses, government agencies, schools, nonprofits) who voluntarily commit to reduce, reuse or recycle nonhazardous solid waste. The Corporate Recycling Councils and other partner organizations throughout Texas are working with the TNRCC to promote the CLEAN TEXAS STAR program. CLEAN TEXAS STAR has more than 3,000 members, 48 percent of whom have made a commitment to reduce their nonhazardous solid waste by 25 percent by the year 2000; 18 percent have committed to a 50 percent reduction; and 34 percent have committed to a 75 percent reduction. The average quantity of material reduced, reused, or recycled by CLEAN TEXAS STAR members nearly tripled in their first year of membership.

Site Assistance Visit (SAV) Program and P4 Training. These voluntary, nonregulatory programs are administered by OPPR technical staff trained in methods of source reduction, waste minimization, and mechanical and chemical engineering. SAVs are conducted at participating facilities to review the facility's waste streams, operations, water and energy conservation efforts, and current pollution; and to make multimedia (air, water, and waste) pollution prevention suggestions. Permanent Pollution Prevention Program (P4) training is a day-long training offered to facilities across the state to help them set up and sustain programs. More than 226 facilities have participated since 1993, achieving a 96,000-ton reduction in hazardous and nonhazardous waste; an 11.3 million kilowatt-hour reduction in energy usage; and a 183,000-pound reduction in emissions.

Recycling and Market Development Assistance. The OPPR, with national and international market development expertise, helps local governments and businesses access markets for recyclable materials. To spotlight recycling market trends and provide timely prices for recyclables, the OPPR distributes Market News, a monthly newsletter, to 3,000 subscribers. The workplace recycling program provides training and technical assistance to businesses seeking to create or improve recycling programs, while the municipal recycling program provides technical assistance to communities that are developing curbside recycling, composting, and other recycling projects. A large Dallas area property management firm, working in partnership with the OWE, has established a company-wide recycling program that may be the largest workplace recycling program in the nation, covering more than 6 million square feet.

Appendix B: The Waste Reduction Advisory Committee Annual Report

The Waste Reduction Advisory Committee (WRAC) contains a balanced representation of environmental and public interest groups and the regulated community. The WRAC was established by the 71st Texas Legislature to advise the TNRCC on the following:

- the appropriate organization of state agencies and the financial and technical resources required to aid the state in its efforts to promote waste reduction and minimization
- the development of public awareness programs to educate citizens about hazardous waste and the appropriate disposal of hazardous waste and hazardous materials that are used and collected by households
- the provision of technical assistance to local governments for the development of waste management strategies designed to assist Small Quantity Generators of hazardous waste
- other possible programs to more effectively implement the state's hierarchy of preferred waste management technologies as set forth in Section 361.0223(a)

The WRAC assists the TNRCC in the development of pollution prevention and waste reduction programs. The WRAC has been instrumental in designing voluntary programs such as Clean Texas 2000, the Governor's Awards for Environmental Excellence, implementation of the Waste Reduction Policy Act of 1991, and integrating pollution prevention into existing regulatory programs.

The WRAC membership provides a forum for stakeholders from industry, environmental and public interest organizations, local and regional government, and academia to participate in the development of pollution prevention programs in Texas. As a result, such programs are significantly reducing pollution in Texas, and a recycling industry has been born that creates new jobs and markets for recyclables.

During 1995 and 1996, the WRAC established the Clean Industries 2000 Team and the Clean Cities 2000 Team to foster the development of voluntary reduction programs. This resulted in two major events each year that increased networking between industry, government, and communities. Over the past two years, the WRAC has:

- participated in the development of the Clean Industries 2000 annual meeting
- participated in the first Clean Cities 2000 annual meeting in Austin
- provided input and assisted in the creation of the Clean Texas Star program
- created the Clean Industries 2000 Team

- created the Clean Cities 2000 Action Team
- coordinated the development of the TNRCC Compost Rules the agency's first multi-media rulemaking
- promoted pollution prevention regulatory integration efforts at the TNRCC
- participated in the National Pollution Prevention Roundtable
- met quarterly, even though travel reimbursement was eliminated in 1995
- assisted in the development of a household hazardous waste network created the Clean Industries 2000 PLUS program

The WRAC met four times in Austin during 1996. Copies of the WRAC work plan or meeting minutes can be obtained by contacting the OPPR.

Waste Reduction Advisory Committee Members

Charles Bland, Co-Chair, Shell Oil Company

Ken Kramer, Ph.D., Co-Chair, Lone Star Chapter Sierra Club

Honorable J.E. (Buster) Brown, Texas Senate

Paul Gowan, Texas Instruments

Jack Hopper, Ph.D., Lamar University

Susana Almanza, People Organized in Defense of Earth and her Resources (PODER)

Reggie James, Consumer's Union-Southwest Regional Office

Paul Zweiacker, Ph.D., Texas Utilities Services

Chris Sagstetter, City of Houston

Jim Kachtick, Occidental Chemical Corporation

Melanie Barnes, League of Women Voters

Justine R. Ormsby, Rio Grande Council of Governments

Appendix C: Members of Clean Cities 2000



1. Alamo
2. Austin
3. Bastrop
4. Beaumont
5. Booker
6. Borger
7. Brenham
8. Bruceville-Eddy
9. Bryan
10. Burleson
11. Canadian
12. Carrollton
13. Clute
14. College Station
15. Corpus Christi
16. Crockett
17. Cuero
18. Dallas
19. Darrouzett
20. Denton
21. Edinburg
22. Euless
23. Follett
24. Fort Worth
25. Fort Hood
26. Fredericksburg

27. Frisco
28. Fritch
29. Gainesville
30. Garland
31. Georgetown
32. Goliad
33. Gonzales
34. Gruver
35. Hallettsville
36. Harlingen
37. Higgins
38. Kerrville
39. La Grange
40. Lake Jackson
41. Lubbock
42. Lufkin
43. Nacogdoches
44. N. Richland Hills
45. Pampa
46. Panhandle
47. Perryton
48. Plano

49. Port Lavaca
50. Quintana
51. Richardson
52. San Antonio
53. Schulenburg
54. Smithville
55. Spearman
56. Stinnett
57. Surfside Beach
58. Sweeny
59. Texas City
60. The Colony

61. Victoria
62. Waco
63. Whitehouse



64. Big Spring
65. Fort Stockton
66. Laredo
67. Temple

Appendix D: Governor's Awards for Environmental Excellence Winners 1993-96

Agriculture

1993	Arrowhead Mills, Hereford
1994	Seco Creek Water Quality Demonstration Project, Hondo
1995	Texas Agricultural Extension Service, College Station
1996	Matagorda County Rice Farmers, Bay City

Civic / Nonprofit Organization

1993	El Paso Retired Senior Volunteer Program (RSVP), El Paso
1994	Valley Proud Environmental Council, Rio Grande Valley
1995	Friends of the Cibolo Wilderness, Boerne
1996	Austin Habitat for Humanity, Austin

Comprehensive Environmental Project

1995	Lower Colorado River Authority, Austin
------	----------------------------------------

Education

1993	Monsignor Kelly High School, Beaumont
1994	E.M. Pease Middle School, San Antonio
1995	Rio Grande International Study Center, Laredo
1996	Harris-Galveston Coastal Subsidence District, Friendswood

Government

1993	City of Plano
1994	City of Austin
1995	El Paso Water Utilities
1996	City of Austin

Individual

1993	Toni Lundgren, Cameron
1994	J. David Bamberger, Bamberger Ranch, Blanco County
1995	William E. Knoop, Ph.D., Mount Vernon
1996	Bernice DeLora Owens, Houston

Innovative Technology

1996	Huntsman Corporation, Austin
------	------------------------------

Large Business / Non-Technical

1993	Baxter Healthcare Corporation, Jacksonville
1994	Mary Kay Cosmetics, Inc., Dallas
1995	Motorola, Austin
1996	Amoco Chemical Corporation, Texas City

Large Business / Technical

1993	Fisher Controls International, McKinney Texas Eastman/Eastman Chemicals, Longview
1994	Du Pont, La Porte
1995	Lockheed Martin Tactical Aircraft Systems, Fort Worth
1996	International Paper Company, Texarkana

Media

1993	TSM Television/Radio, El Paso
1994	WFAA-TV - Don Wall, Environmental Reporter, Dallas/Fort Worth
1995	KRIS-TV, Corpus Christi
1996	Clear Channel Communications, Austin

Small Business

1994	Chem-Pruf Door Company, Brownsville
1995	Lone Star Radiator Company, Inc., San Antonio
1996	Benchmark Research & Technology, Inc., Midland

Youth Organization

1993	Denton High School Ecology Club, Denton
1994	Graffiti Grapplers, Anson Jones Middle School, San Antonio
1995	Gregory-Portland Junior High Science Clubs: Naturalist Club and SeaStars, Portland
1996	Color Cats, Austin Elementary, Harlingen

Special Award Winners

- 1993 AT&T Microelectronics, Inc., Mesquite Becker Elementary, Austin
BP Chemicals/Green Lake Facility, Port Lavaca
Jim Kennedy, Du Pont, Gulf Coast Region
Ken Kramer, Lone Star Chapter Sierra Club, Austin
La Porte Post Office, La Porte
- 1994 Champion International Corporation, Houston
Keep 5 Alive, Houston
Project Del Rio, Rio Grande Border Region
Texas Instruments, Statewide
Krsiti Wiseman, Fort Worth
- 1995 Air Products, Inc., Pasadena
Valero Refining Company, Corpus Christi
- 1996 Celanese Engineering Resins, Inc., Bishop

CLEAN INDUSTRIES 2000 Facilities Grouped by Area

★ = Class of 1996

El Paso

Asarco, Inc., El Paso

North Texas

AT&T Power Systems, Mesquite
Alcatel Network Systems, Inc., Richardson
Bell Helicopter Textron Inc., Fort Worth
Boeing Defense & Space, Irving
Boeing Defense & Space, Corinth ★
Cargill Incorporated, Saginaw ★
Carrier, Tyler
Chaparral Steel Co., Midlothian
Composite Technology, Fort Worth
Elf AtoChem, Crosby
Fisher Controls, McKinney
GNB, Dallas
Jetco, Corsicana
Lockheed, Fort Worth
SACHEM, Cleburne
SGS-Thomson Microelectronics, Inc., Carrollton
Sherwin-Williams Company, Garland
Texas Instruments, Inc., Dallas
Texas Instruments, Inc., Dallas-Forest Lane
Texas Instruments, Inc., Dallas-Lemmon Avenue
Texas Instruments, Inc., Lewisville
Texas Instruments, Inc., Sherman
Texas Instruments, Inc., McKinney
Valspar Corp., Garland
Vought Aircraft Co., Dallas

Corpus Christi Area

American Chrome & Chemicals, Inc., Corpus Christi
Citgo Refining & Chemicals, Inc., Corpus Christi
E.I. Du Pont De Nemours, Corpus Christi
Hoechst Celanese Chemical Corp., Inc., Bishop
Hoechst Celanese, Corpus Christi
Koch Refining Co., Corpus Christi
Occidental Chemical Corp., Ingleside
Oxy Petrochemicals, Corpus Christi
Southwestern Refinery, Corpus Christi
U.S. Naval Air Station, Corpus Christi
Valero Refining Co., Corpus Christi
Victoria/Gulf Coast Area
BP Chemicals, Inc., Green Lake Facility
Carbide/Graphite Group, Inc., Seadrift
E.I. Du Pont De Nemours, Victoria
Lyondell, Matagorda
Lyondell, Victoria
Union Carbide Corp., Seadrift

Wichita Falls Area

Rhone-Poulenc Specialty Chemicals Co., Inc., Vernon
Graham Magnetics, Inc., Graham

San Antonio Area

Kelly A.F.B., San Antonio
Motorola, Seguin ★
Sony Microelectronics, San Antonio

Structural Metals, Inc., Seguin

Waco-Temple Area

Tennaco, Temple
Texas Instruments, Inc., Temple
Wilsonart International, Temple North ★
Wilsonart International, Temple South ★
Wilsonart International, Gibraltar ★

Abilene Area

3M Corporation, Brownwood

East Texas Area

International Paper, Texarkana
Texas Eastman, Longview
Union Pacific Railroad, Palestine
Nucor Steel, Texas Division, Jewett

Midland-Odessa Area

Penatek Industries, Odessa ★
Rexene Corporation, Odessa ★
Texas Instruments, Inc., Midland

West Texas/Panhandle Area

Excel Corp., Friona
Excel Corp., Plainview
Hoechst Celanese Chemical Corp., Inc, Pampa
Phillips 66 Co., Borger

Houston Area

ARCO, Channelview
Air Products Manufacturing Corp., Pasadena
Akzo Chemicals, Inc., Deer Park
Albemarle Corporation, Pasadena
Amoco Chemical Co., Chocolate Bayou
Amoco Chemical Co., Texas City
BASF Corp., Freeport
Bayer Corporation, Baytown
Bayer Corporation, Houston
Catalyst Resources, Inc., Pasadena
DOW U.S.A., Freeport
DOW Chemical Co., La Porte
Drilling Specialties Co. - Alamo Plant, Conroe
E.I. Du Pont De Nemours, La Porte
EGP Fuels Co., La Porte
Enron Methanol Co., Pasadena
Ethyl Corp., Houston
Exxon Chemical Co., Baytown Olefins Plant
Exxon Chemical Co., Baytown Chemical Plant
Exxon Chemical Co., Mont Belvieu
FMC Corp., Bayport
Geon Co., La Porte
Gulf Chemical & Metallurgical, Houston
Hoechst Celanese Chemical Group, Inc., Bay City Plant
Hoechst Celanese Chemical Corp., Clear Lake Plant
Howell Hydrocarbons & Chemicals, Inc., Channelview
Huntsman, Conroe
SK Biotech Corp., Houston
ISP Technologies, Inc., Texas City
Lubrizol Corp., Deer Park

Lubrizol Corp., Pasadena
Lyondell Petrochemical Co., Pasadena
Marathon Oil Co., Texas City
Monsanto, Chocolate Bayou
Montell USA, Pasadena
Nalco Chemical Co., Freeport
Nalco Chemical Co., Sugar Land
Occidental Chemical Corp., Houston
Chemical Complex (Houston, Deer Park & Battleground)
Occidental Chemical Corp., Bayport
Occidental Chemical Corp., Chocolate Bayou
Occidental Chemical Corp., Pasadena
Occidental Chemical - Houston Ammonia Terminal, Pasadena
Oxychem Pipeline, Pearland
Phillips 66 Co., Houston Chemical Complex
Phillips Petroleum Co., Sweeny
Refinery & Petrochemical Complex
Quantum, La Porte
Rhone-Poulenc Basic Chemical, Baytown ★
Rhone-Poulenc Basic Chemical Co., Houston
Rhone-Poulenc, Inc., Freeport
Rohm & Haas Texas, Inc., Deer Park
Schenectady International, Inc., Freeport
Shell Oil Co., Deer Park
Shintech Inc., Freeport
Solvay Polymers, Inc., Deer Park
Sterling Chemicals, Inc., Texas City
Stolt-Nielsen, Inc., Houston
Texas Instruments, Inc., Houston
Texas Petrochemicals Corp., Houston
Union Carbide Chemicals & Plastics Co., Inc., Texas City

Beaumont-Port Arthur-Orange

E.I. Du Pont De Nemours, Beaumont
E.I. Du Pont De Nemours, Sabine River Works
Goodyear Tire & Rubber Co., Beaumont Chemical Plant
OxyChem/PD Glycol, Beaumont
Quantum Chemical Corp., Port Arthur
Star Enterprise, Port Arthur Plant
Star Enterprise, Port Arthur Terminal
Star Enterprise, Port Neches
Texaco Chemical Co., Port Arthur

Austin Area

Advanced Micro Devices, Inc., Austin
Camp Mabry, Austin ★
Huntsman Corporation, Austin ★
IBM Corp., Austin
Lower Colorado River Authority, La Grange
Lower Colorado River Authority, Marble Falls
Lower Colorado River Authority, Sim Gideon Power Plant, Bastrop
Motorola - Ed Bluestein, Austin
Motorola - Oak Hill, Austin
Kaspar Wire Works, Inc., Shiner
Texas Instruments, Inc., Austin